WHAT IS CLAIMED IS:

1. A eukaryotic cell that comprises a prokaryotic recombinase polypeptide or a nucleic acid that encodes a prokaryotic recombinase, wherein the recombinase can mediate site-specific recombination between a first recombination site and a second recombination site that can serve as a substrate for recombination with the first recombination site, but in the absence of an additional factor that is not present in the eukaryotic cell cannot mediate recombination between two hybrid recombinase recombination sites that are formed upon recombination between the first recombination site and the second recombination site.

2. The eukaryotic cell of claim 1, wherein the recombinase is selected from the group consisting of a bacteriophage ΦC31 integrase, a coliphage P4 recombinase, a Listeria phage recombinase, a bacteriophage R4 Sre recombinase, a CisA recombinase, an XisF recombinase, and a transposon Tn*4451* TnpX recombinase.

3. The eukaryotic cell of claim 1, wherein the recombinase is a bacteriophage ΦC31 integrase.

4. The eukaryotic cell of claim 1, wherein the first recombination site is an *attB* site and the second recombination site is an *attP* site.

5. The eukaryotic cell of claim 1, wherein the cell further comprises a first recombinase recombination site.

6. The eukaryotic cell of claim 1, wherein the cell comprises a nucleic acid that comprises a coding sequence for an recombinase polypeptide, which coding sequence is operably linked to a promoter that mediates expression of the recombinase-encoding polynucleotide in the eukaryotic cell.

7. The eukaryotic cell of claim 6, wherein the nucleic acid further comprises a selectable marker.

8. The eukaryotic cell of claim 6, wherein the promoter is an inducible or a repressible promoter.

9. The eukaryotic cell of claim 8, wherein the nucleic acid is the plasmid pLT43.

10. The eukaryotic cell of claim 1, wherein the eukaryotic cell is selected from the group consisting of an animal cell, a plant cell, a yeast cell, an insect cell and a fungal cell.

11. The eukaryotic cell of claim 10, wherein the eukaryotic cell is a mammalian cell.

12. The eukaryotic cell of claim 10, wherein the eukaryotic cell is present in a multicellular organism.

13. A method for obtaining site-specific recombination in a eukaryotic cell, the method comprising:

providing a eukaryotic cell that comprises a first recombination site and a second recombination site, which second recombination site can serve as a substrate for recombination with the first recombination site;

contacting the first and the second recombination sites with a prokaryotic recombinase polypeptide, resulting in recombination between the recombination sites, thereby forming one or two hybrid recombination sites;

wherein the recombinase polypeptide can mediate site-specific recombination between the first and second recombination sites, but cannot mediate recombination between two hybrid recombination sites in the absence of an additional factor that is not present in the eukaryotic cell.

14. The method of claim 13, wherein the eukaryotic cell is selected from the group consisting of a yeast cell, a fungal cell, a plant cell, an insect cell and an animal cell.

15. The method of claim 13, wherein the first recombination site is present in a chromosome of the eukaryotic cell.

16. The method of claim 15, wherein the second recombination site is present in a second chromosome of the eukaryotic cell and contacting the first and second recombination sites with the recombinase results in translocation of chromosome arms.

17. The method of claim 13, wherein the first recombination site and the second recombination site are present on a single nucleic acid molecule.

18. The method of claim 17, wherein the first recombination site and the second recombination site are in a direct orientation.

19. The method of claim 18, wherein the recombination results in excision of the portion of the nucleic acid molecule that lies between the first and second recombination sites.

20. The method of claim 17, wherein the first recombination site and the second recombination site are in an inverted orientation.

21. The method of claim 20, wherein the recombination results in inversion of the portion of the nucleic acid molecule that lies between the first and second recombination sites.

22. The method of claim 13, wherein the eukaryotic cell comprises a polynucleotide that encodes the recombinase polypeptide.

23. The method of claim 22, wherein the recombinase-encoding polynucleotide is operably linked to a promoter which mediates expression of the polynucleotide in the eukaryotic cell.

24. The method of claim 23, wherein the promoter is an inducible or a repressible promoter.

25. The method of claim 24, wherein the promoter is a *Pmnt* promoter.

26. A method for obtaining a eukaryotic cell having a stably integrated transgene, the method comprising:

introducing a nucleic acid into a eukaryotic cell that comprises a first recombination site, wherein the nucleic acid comprises a transgene and a second recombination site which can serve as a substrate for recombination with the first recombination site; and

contacting the first and the second recombination sites with a prokaryotic recombinase polypeptide, wherein the recombinase polypeptide catalyzes recombination between the first and second recombination sites, resulting in integration of the nucleic acid at the first recombination site, thereby forming a hybrid recombination site at each end of the nucleic acid;

wherein the recombinase polypeptide can mediate site-specific recombination between the first and second recombination sites, but cannot mediate recombination between two hybrid recombination sites in the absence of an additional factor that is not present in the eukaryotic cell.

27. The method of claim 26, wherein the recombinase polypeptide is selected from the group consisting of a bacteriophage ΦC31 integrase, a coliphage P4 recombinase, a Listeria phage recombinase, a bacteriophage R4 Sre recombinase, a CisA recombinase, an XisF recombinase, and a transposon Tn*4451* TnpX recombinase.

28. The method of claim 27, wherein the recombinase is a ΦC31 integrase.

29. The method of claim 26, wherein the recombinase polypeptide is introduced into the eukaryotic cell by expression of a polynucleotide that encodes the recombinase polypeptide.

30. The method of claim 29, wherein the polynucleotide that encodes the recombinase polypeptide is operably linked to a promoter that functions in the eukaryotic cell.

31. The method of claim 30, wherein the promoter is an inducible or a repressible promoter.

32. A nucleic acid that comprises a polynucleotide sequence that encodes a bacterial recombinase polypeptide operably linked to a promoter that functions in a eukaryotic cell, wherein the recombinase polypeptide cannot mediate recombination between two hybrid recombination sites that are formed upon recombination between a first recombination site and a second recombination site in the absence of an additional factor.

33. The nucleic acid of claim 32, wherein the nucleic acid further comprises at least one recombination site that is recognized by the recombinase polypeptide.

34. The nucleic acid of claim 32, wherein the nucleic acid comprises a plasmid vector.

35. The nucleic acid of claim 34, wherein the vector is pLT43.

36. A eukaryotic cell that comprises a polynucleotide that comprises a first bacteriophage ΦC31 recombination site.

37. The eukaryotic cell of claim 36, wherein the recombination site is selected from the group consisting of *attP* and *attB*.

38. The eukaryotic cell of claim 36, wherein the eukaryotic cell further comprises a second polynucleotide that comprises a second ΦC31 recombination site that undergoes recombination with the first ΦC31 recombination site when contacted with a ΦC31 integrase polypeptide.

39. The eukaryotic cell of claim 38, wherein:

the first recombination site is *attB* and the second recombination site is *attP*; or

the first recombination site is *attP* and the second recombination site is *attB*.

40. The eukaryotic cell of claim 38, wherein the second polynucleotide further comprises a transgene.

41. The eukaryotic cell of claim 38, wherein the second polynucleotide further comprises a selectable marker.

42. The eukaryotic cell of claim 36, wherein the eukaryotic cell further comprises a ΦC31 integrase polypeptide.

43. The eukaryotic cell of claim 36, wherein the eukaryotic cell further comprises a nucleic acid that comprises a polynucleotide that encodes a ΦC31 integrase polypeptide.

44. The eukaryotic cell of claim 43, wherein the nucleic acid further comprises a selectable marker.

45. The eukaryotic cell of claim 43, wherein the nucleic acid further comprises a promoter which results in expression of the ΦC31 integrase-encoding polynucleotide in the cell.

46. The eukaryotic cell of claim 45, wherein the promoter is an inducible promoter.

47. The eukaryotic cell of claim 36, wherein the eukaryotic cell is selected from the group consisting of a yeast cell, a fungal cell, a plant cell, and an animal cell.